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(12) (19) (CA) **Brevet-Patent**

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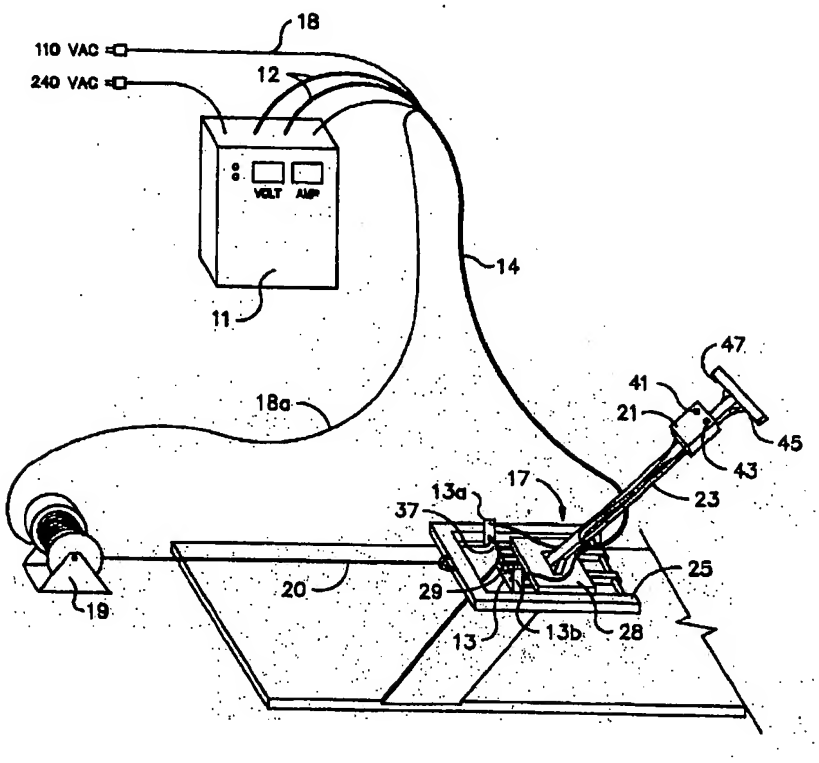
(54) **DISPOSITIF POUR PELER UNE BANDE DE TRANSPORTEUR**

(54) **CONVEYOR BELT STRIPPER**



(57) Méthode et appareil améliorés pour enlever une couche d'élastomère sur une bande transporteuse stratifiée. La bande d'élastomère est séparée de la couche adjacente au moyen d'une lame de couteau suffisamment chauffée pour faire fondre la bande d'élastomère à son point de contact avec la couche adjacente.

(57) An improved method and apparatus for stripping a layer of elastomeric material from a laminated conveyor belt wherein the elastomeric strip is separated from the adjacent layer with a knife edge heated sufficiently to melt the elastomeric strip at its point of contact with the adjacent layer.

ABSTRACT

An improved method and apparatus for stripping a layer of elastomeric material from a laminated conveyor belt wherein the elastomeric strip is separated from the adjacent layer with a knife edge heated sufficiently to melt the elastomeric strip at its point of contact with the adjacent layer.

This invention relates to improved means for removing the rubber layer from a laminated conveyor belt and, in particular, employs a heated blade to melt the rubber at its point of attachment to an inner ply of the belt, thereby enabling the rubber to be readily pulled away.

BACKGROUND OF THE INVENTION

An endless conveyor belt is made by joining together the ends of a length of belt material. The belt material is usually made with several plies of material (e.g., a laminate) and, in general, will have an inner ply made of cords, usually steel, extending along the length of the belt in order to prevent excessive stretching of the belt during use. In general, the conveyor belts to which this invention applies will have a central layer of steel or other metal cord covered on each side with an appropriate elastomeric material.

During use, however, damage frequently occurs to conveyor belts and it becomes necessary to make repairs on the belt. Such repairs require that a layer of the belt material be removed. One method of removing a layer of belt material from a conveyor belt is to form a cut in the layer of material across the length of the belt at a predetermined distance from the end of the belt, and to form one or more cuts along the length of the belt between the cross cut and the end of the belt. The strips formed by the cuts in the layer of belt material then can be peeled away from the other layers of belt material. The peeling away of the strip of

material is usually done by hand or by use of a winch and the strips of material are pulled away while simultaneously cutting the adhesive or bond between the layers of material with a knife or other sharp instrument. Since the layers of the belt material are usually securely bonded together so that the belt will last a long time when in use, the task of stripping the outer layers at the ends of a belt is onerous and time consuming.

DISCUSSION OF PRIOR ART

U.S. 3,929,555 discloses a conveyor belt stripper system in which a winch on a portable framework is used to pull from the belt strips of material cut by hand.

SUMMARY OF THE INVENTION

The present invention relates to an improved method of stripping a layer of elastomeric material from a laminated conveyor belt wherein an outer layer of the elastomer is cut into strips and the strips are pulled away from an adjacent layer of the belt, the improvement which comprises separating the elastomeric strip from the adjacent layer with a knife edge which is heated sufficiently to melt the elastomeric strip at its point of contact with the adjacent layer, whereby removal of the elastomeric strip is greatly facilitated.

Another embodiment of the invention is an apparatus used in the method of the invention which comprises, in combination, a knife edge adapted to contact the juncture of metal cord and elastomer of a laminated conveyor belt,

supporting means for the knife edge on a guiding frame and electrical means to heat the knife edge to a temperature sufficient to melt the elastomeric layer.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the apparatus in use.

Fig. 2 is an expanded, detailed view of how the knife edge is mounted on the apparatus.

Fig. 3 is a cross-sectional view showing the function of the knife edge.

DETAILED DESCRIPTION OF THE INVENTION

The equipment required to carry out the method of the invention will comprise a power source, an apparatus to hold and guide the knife edge and means to pull the strips of elastomer from the conveyor belt, preferably a winch or similar device which enables a controlled pull of the knife edge through the rubber at the junction of the layers of the conveyor belt. Referring now to Fig. 1, a power source 11 supplies electrical power through two 4/0 welding cables 12 and umbilical cord assembly 14 to a knife edge 13 through contact points 13a and 13b. The knife edge is mounted on a finger assembly 29 (see detail in Fig. 2 and Fig. 3) which in turn comprise part of a guiding apparatus shown generally as 17. A winch 19 is powered by a separate source of power through electric cables 18 and 18a via a power controller box 21 and series of on/off switches 41 (toggle) and 45 (spring off) and a foward/reverse selector switch 43 mounted on handle 23 of the guiding frame 17.

The guiding frame 17 comprises a sled frame assembly 25 made of structural material such as aluminum, a support 27 made of insulating material, such as wood, which supports a finger assembly made of structural material, such as steel, shown generally as 29, a knife edge blade 13 mounted on the finger assembly, which blade is electrically heated, a handle 23 attached to a metal plate 28, preferably aluminum, which is fastened to the support 27 and a spring switch 47 (also known as a trigger switch) to provide on/off control of the power source 11 via umbilical cord 14 to supply electrical energy to the blade for heating.

In using the unit, the operator is required to pull switches 45 and 47 in such a way to preheat and maintain heat to the blade and to pull the sled arrangement 25 toward the winch. The direction of the sled arrangement is controlled by the directional orientation of the winch line 20 and the operator's input via the handle.

The knife edge blade used in the invention must have certain characteristics to make it practical. The back section of the blade must be sufficiently strong for mounting and have higher electrical resistant properties than the front section so as to direct most of the electrical current to the front edge which is to be heated. The front edge, however, must have good edge holding ability and for these reasons, a blade fabricated from two dissimilar metals is preferred. The preferred blade for use in the invention has a back section consisting of spring steel having a Rockwell C

hardness of from about 38 to about 40 and a front edge section consisting of AISI M42 alloy which has been treated to achieve a Rockwell C hardness of from about 65 to about 68. Such material is readily available as it is used to make band saw blades and the preferred knife edge blade for use in the invention is readily made from an appropriate length of such a band saw blade before it is toothed. It is desirable also to sharpen the front knife end section of the blade and to bend the ends of the blade to provide contact points for the electrical cords to the power source.

Referring now to Fig. 2, the mounting of the knife edge blade 13 on finger assembly 29 is shown in expanded detail. The blade 13 is mounted on fingers 15 which extend from the front of the insulating support 27. The mounting may be accomplished by means of bolts, screws, or other fasteners 31 which attach the rear portion 30 of the blade 13 to the fingers 15. The ends of the blade 13a and 13b are bent at an angle from the portion of the blade attached to the fingers to provide connection points for attaching the electric cables 12a and 12b to the knife edge blade.

To remove a layer of belt material from the conveyor belt, a cut is made in the upper layer of material across the length of the belt and, if the belt is wide enough, one or more cuts are made along the length of the belt between the cross cut and the end of the belt. The heated knife edge blade is then positioned at one edge of the strip to be removed and as the elastomeric material melts, it is pulled

away by hand or by attachment to a winch as shown in U.S. 3,925,555.

Referring now to Fig. 3, which is a sectional view taken along line 3-3 of Fig. 2, the conveyor belt is shown as a three layer laminate; viz., a bottom elastomeric layer 33, a middle section 35 composed of steel cable and an upper elastomeric layer 37 which is pulled away as the heated blade 13 meets and melts elastomeric layer 37 at its point of attachment to the cable layer 35.

As indicated, the movement of the sled 25 is dependent upon the winch 19 which is readily controlled by the operator using the forward/reverse selector switch 43 on control box 21. Similarly, the electric power to the blade may be readily controlled by a rheostat control (not shown) on the power source 11 and a spring switch 47 in handle 23 to turn the power off and on to the blade to maintain it at a desired constant heat level. The spring on/off switch 47 is used by the operator to optimize the heating of the blade during the stripping process.

The apparatus and method of the invention greatly enhances the speed and ease of removing an elastomeric layer from a conveyor belt and as work time is reduced, so is the cost of the operation. As an indication of the improved efficiency that the invention provides, it has heretofor required about 20 minutes to remove 10 feet of elastomer from a conveyor belt, whereas using the method of the invention, the same length of elastomer can be stripped from the belt in

8 minutes, thus achieving a significant reduction of work time.

CLAIMS

1. An apparatus for removing a section of elastomer from a laminated conveyor belt comprised of a central metal cord covered on each side with an elastomeric material which apparatus comprises in combination a knife blade adapted to have its front edge contact said metal cord where it meets an upper elastomeric layer of said conveyor belt, guiding means on which said knife edge is mounted and electrical means to heat said knife edge to a temperature sufficient to melt the elastomeric material of said conveyor belt.
2. The apparatus of Claim 1 wherein an electrically controlled winch is used to pull said apparatus.
3. The apparatus of Claim 1 wherein the knife blade is fabricated from two dissimilar metals, the metal blade comprising a front edge section of said blade having good edge holding ability and the metal comprising a back section of said blade having an electrical resistance higher than said front edge section.
4. The apparatus of Claim 1 wherein the knife blade is comprised of a back supporting section and a front edge section wherein the back section consists of a spring steel having a Rockwell C hardness of from about 38 to about 40 and the front edge consists of AISI M42 alloy which has been heat treated to obtain a Rockwell C hardness of from about 65 to about 68.

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5. In the process of stripping an elastomeric layer from a laminated conveyor belt comprised of a central metal cord covered on each side with an elastomeric material wherein an outer layer of the elastomer is cut into strips and the strips pulled away from an adjacent layer of the belt, the improvement which comprises the steps of

a) making one or more cuts in the upper layer of the elastomer across the length of the belt;

b) positioning a knife edge to contact said metal cord where it meets an upper elastomeric layer of said belt;

c) electrically heating said knife edge sufficiently to melt said elastomer;

d) pulling said heated knife edge along said cut section

and

e) removing the elastomeric strip.

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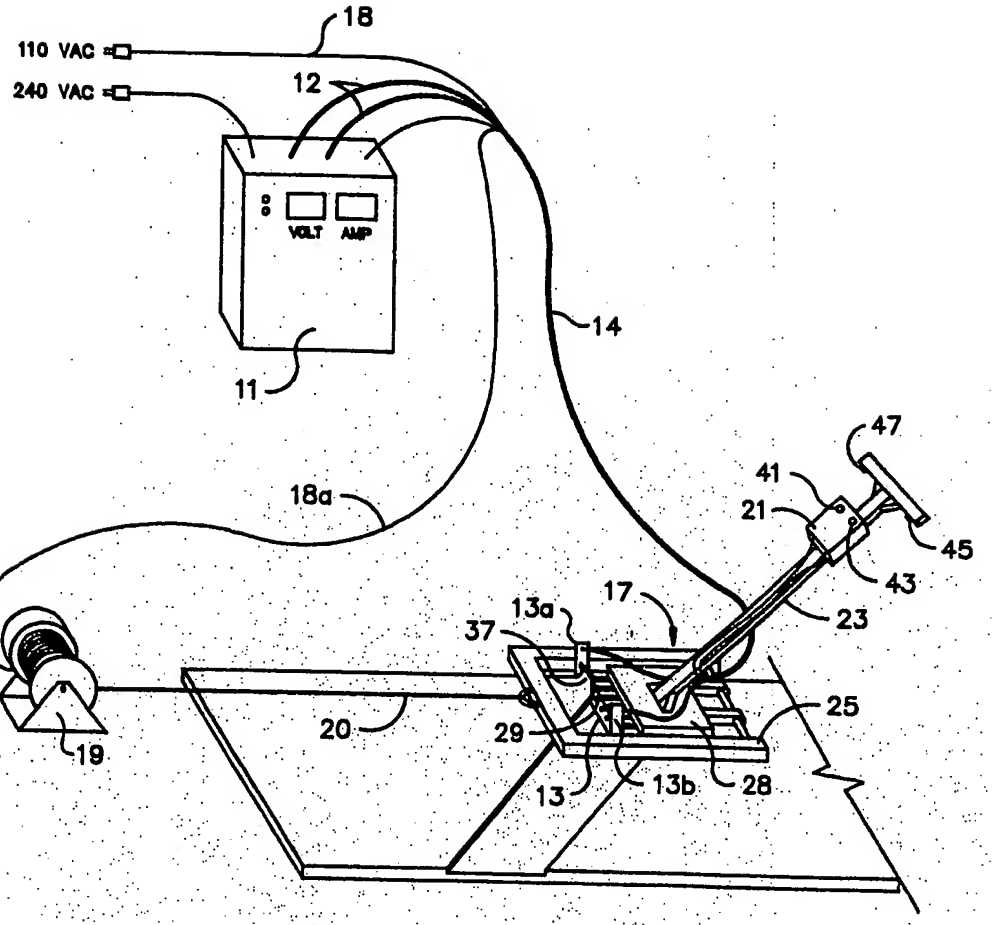
FIG 1



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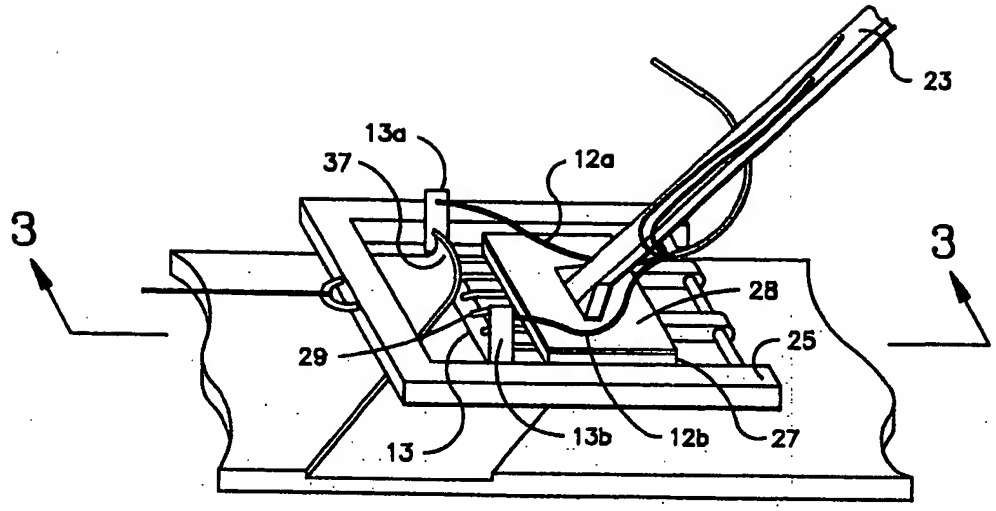

FIG 2

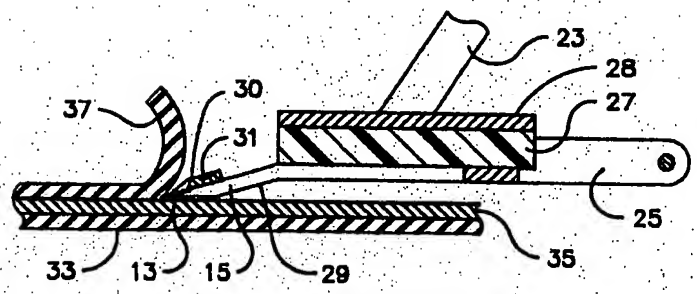

FIG 3

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